

Tackling Wicked Problems: Suicide in the US Military

LT Darryl Diptee
Naval Postgraduate School
darryl.diptee@navy.mil

LTJG Jason Baker
Old Dominion University
jbake028@odu.edu

ABSTRACT

Every 24 hours a member of the United States (US) Armed Forces commits suicide, while every hour a US veteran takes his own life. These statistics illuminate a deeply-rooted social crisis which eludes experts and military leaders to this day. Billions of dollars invested in suicide prevention seem to offer little relief for active duty servicemen and veterans alike. Military suicide is framed as a wicked problem and the new and exciting theory of Chronic Emotional Atrophy (CEA) is proposed to help explain causes of suicidal ideation in the military. A holistic crisis management strategy via information systems is presented in this work. Depressive symptoms exhibited by military members in emotionally suppressed environments closely parallel those phenomena exhibited by medical patients suffering from frontal lobe damage. The prospective psychiatric information system solution provides frontal lobe stimulation (FLS) to mitigate CEA and suicidal ideation.

Keywords

Military suicide; mental health; social crisis; chronic emotional atrophy; CEA; depression; neurology; veteran; wicked problem; frontal lobe stimulation; FLS; frontal lobe damage; FLD; information system solution; Emotional Vitality Assistant; EVA.

INTRODUCTION

The US military's battle with suicide has been long, treacherous and unfortunately, unsuccessful. The past several years have seen an increase in active duty suicides now averaging one per day (Thompson and Gibbs, 2012) with 2012 culminating as highest military suicide rate on record (Briggs, 2013). The suicide rate for veterans (i.e. active duty military who leave the military and reintegrate into civilian life) is estimated at 22 per day (Kemp and Bossarte, 2012); however, it should be noted that this estimate is extrapolated from extremely limited data and the veteran suicide rate could potentially be much higher. Only 16 of the 50 states include veteran status as part of their suicide mortality recording process (Harrell and Berglass, 2011), with 23% of existing suicide records listing veteran status as either unknown or not reported (Kemp *et al.*, 2012).

Experts and military leaders remain perplexed as to the underlying causes of suicidal ideation. Some explanations pinpoint frequent deployments, combat exposure, prescription medication etc. as leading causes, but no single theory offers sufficient reliability and predictability. It is well known that the cause of suicidal ideation remains a mystery; the head of the Pentagon's Defense Suicide Prevention Office recently said in a statement, "What makes one person become suicidal and another not, is truly an unknown" (Burns, 2012). So far, attempts at solving the enigma of military suicide have been analogous to shaking a gift box and making an educated guess as to what's inside. Amongst the multitude of preventative programs currently in place to mitigate suicide, Major General Bostick underscored the inability to measure program effectiveness, "...it's not one solution fits all, we really need to come at this at multiple levels from multiple directions. It is very, very complex" (Wong, 2011). Bostick's comments clearly identify the current pre-paradigmatic state of suicide prevention where multiple theories compete to solve this most elusive problem (Kuhn, 1996). Indeed many suicide prevention programs are in place, ranging from hotlines to anti-suicide nasal spray to electroconvulsive therapy (better known as shock therapy); regrettably most of these efforts tend only to the symptoms of depression and not the underlying cause. Until a root cause is identified and manipulated one could argue that rates of suicidal ideation will continue to increase regardless of the amount of money invested in treating suicidal symptoms.

The statistical data available on this topic are overwhelming. Every aspect of military suicide has been statistically sliced and diced in hopes of uncovering hidden suicidal patterns. Listed below are some statistics of military suicides since 2001 (Thompson *et al.*, 2012):

- (a) 95% are male (b) 95% are enlisted (c) 80% are white (d) 45% are under the age of 25
 (e) 83% occur within the US (f) 38% deployed to Iraq or Afghanistan (g) 26% were substance abusers

Data on veterans are considered as well, since their time in military service may contribute to difficulties of reintegration into civilian life. In 2008 the rate of homeless veterans totaled 131,000; double that of the general population (Vital Mission, 2008). On a single night in January 2011, about 1 in 7 homeless adults in the United States were veterans (Estimates of homelessness, 2011). According to two Harvard professors, 1.5 million veterans are without healthcare, resulting in 2,200 veteran deaths each year (AFP, 2009).



Figure 1. Cover of TIME magazine (July 2012) depicting the growing problem of military suicides

The remainder of this paper will be as follows: first, suicide will be framed as a wicked problem, followed by the identification of suicidal indicators and risk factors. The neurological framework used to develop the theory of CEA will then be laid out along with the importance of the frontal lobe in human emotion and behavior. The theory of CEA will then be presented and defined, linking military suicides to frontal lobe dysfunction within emotionally suppressed environments. Finally, the paper provides a human-centric, information system solution to mitigate the social crisis of military suicide along with conclusive remarks.

The wicked problem of military suicide

While the immediate problem of suicide is clear, it merely represents the manifestation of much deeper, interlaced and underlying dilemmas. As identified by Roberts (2000), a wicked problem has four characteristics:

- a) There is no consensus on the problem definition.
- b) The numbers of stakeholders are vast, each with their unique perspective.
- c) The constraints of the wicked problem-space are continually shifting.
- d) There is no consensus on the solution.

The potential causes of high suicide rates in the US military are many; this is evident in the recent New York Times article where five experts suggested drastically different problems as the leading cause of military suicide (Room for Debate, 2011). Also, the list of stakeholders wanting to solve the issue of military suicide is quite extensive, with each bringing to the table personal agendas and distinctive perceptions of reality. The wife, Sergeant, doctor, priest, and Army General all share a desire to end suicide in the US military, but their method and motivation for doing so is drastically different. Complicating matters even further, factors like budgets, military priorities, stakeholder rotation (retirements etc.), wars etc. all contribute to the continually shifting constraints of the wicked problem-space. Finally, proposed solutions for military suicide also lack consensus.

Suicidal Indicators

Though the underlying cause of military suicide may be unclear, the indicators and risk factors leading to suicide are well documented (Suicide Prevention, n.d.). Most suicides and suicidal attempts can be linked to intense emotions of:

- Loneliness – a feeling of social disconnect.
- Worthlessness – feelings of not being valued by others.
- Hopelessness – feelings of separation from other people or a higher power.
- Helplessness – feelings of no control over personal situation.
- Guilt – feelings of performing unforgivable acts.

Some suicidal warning signs include out-of-the-ordinary behavior, withdrawal from friends, misconduct, financial problems, and disregard for personal property.

Risk factors increase the probability of suicide but they do not necessarily mean a person will become suicidal. Some risk factors include substance abuse, relationship problems, transitions, setbacks, gun ownership, and history of depression.

Symptoms of depression and mania include a persistent sad or “empty” mood, loss of pleasure in activities (including sex), restlessness or excessive crying, sleeping too much or too little, excessive weight loss or weight gain, decreased energy, fatigue or feeling “slowed down”, thoughts of death, difficulty making decisions, poor judgment that leads to increased risk-taking, and inappropriate social behavior (Depression, 2005).

NEUROLOGICAL FRAMEWORK

The following sections lay the theoretical foundation which will be used to frame military depression as a psychological dilemma leading to suicide. The literature is pervaded with empirical research which supports that the frontal lobe of the human brain is responsible for emotions and feelings (Nautra, 1971). Medical patients with brain trauma resulting in damage to the frontal lobe appear and may seem normal on the outside, but suffer from emotional numbness on the inside while becoming socially inept (Damasio, 1994). This paper asserts that the symptoms of people suffering with Chronic Emotional Atrophy (CEA) closely parallel those of patients with frontal lobe damage (FLD). This new theory states that CEA occurs when a physically intact frontal lobe lacks stimulation of deep human emotion for prolonged periods of time (months or years) in an emotionally suppressed environment. Due to severe underuse of secondary emotional function of the frontal lobe, it is argued that the emotional capability of the frontal lobe naturally atrophies over time leading to depression and increased risks of suicide.

Frontal Lobe and Emotion

The frontal lobe is highly complex and developed when compared to other parts of the brain (Moselhy, Georgiou and Kahn, 2001), ultimately differentiating mankind from lower animal species (Stuss and Benson, 1984). Functions such as deep emotion, creative thinking, decision making, artistic expression, future planning, and social behavior are all associated with the frontal lobe (Semendeferi, Damasio, Frank, and Van Hosen, 1997). Repeated tests support the premise that a healthy frontal lobe is necessary for the normal processing of emotion, and the evaluation of emotion-inducing stimuli (Rolls, 2004). Considered the “home” of persona by some, the frontal lobe is the emotional epicenter of the brain where secondary emotions are initiated (Damasio, 1994). Unlike primary emotions which are immediate and wired at the primal level in most organisms (for example, fear), secondary emotions are delayed and stem from previously learned experiences and cognitive cycles (for example, relief) (Parrot, 2001). Figure 2 below indicates the location and size of the frontal lobe relative to the rest of the human brain.

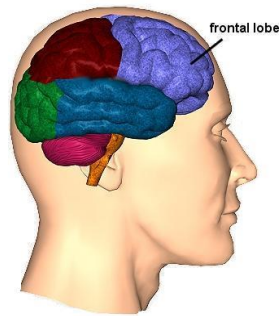


Figure 2. Location of the frontal lobe in the human brain

Effects of Frontal Lobe Damage (FLD)

In *Descartes' Error*, Damasio (1994) explicitly documents the tragedy of Phineas Gage who is considered by many to be the “patient zero” of medical doctrine regarding FLD. In 1848 at the age of 25, a healthy, ambitious, and well-mannered Gage survived an explosion that sent a six-foot steel rod completely through his head. The rod entered his left cheek and exited the top of his skull, totally destroying his frontal lobe but leaving the rest of his brain intact. While amazing that Gage regained full health in two months with no loss of speech, motor skills, intelligence etc., what happened next could not be expected at the time; Gage was no longer Gage. The well-mannered, hard working individual known before the accident became a social menace that was rebellious, seditious and exercised extreme profanity in all social circles. Gage’s new personality made him unrecognizable to even those closest to him and he descended into social exile, dying alone and homeless in San Francisco at the age of 38; an eerie similarity to many US veterans today. Figure 3 below graphically portrays the injuries incurred by Phineas Gage that drastically changed his personality.

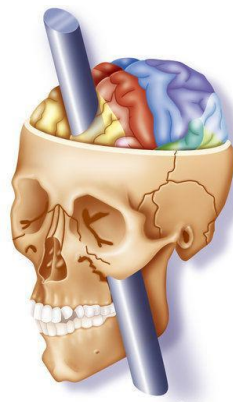


Figure 3. Image depicting Phineas Gage's frontal lobe damage

The literature has since become pervaded with research on FLD and its effects on personality traits. For example, a study of Vietnam veterans showed that those who suffered FLD from war tended to be more violent than those who had non-frontal brain injury, or no brain injury at all (Grafman, Schwab, Warden, Pridgen, Brown and Salazar, 1996). A review of relevant research shows that subjects with trauma to the frontal lobe exhibit elevated aggression and social withdrawal when compared to those who have non-FLD (Brower and Price, 2001). In another study, patients who suffered lateral (side) damage to the frontal cortex were found to experience increased severity of depressive symptoms along with impairment of social functioning (Paradiso, Chemerinski, Yazici, Tartaro and Robinson, 1999). The same study also found that mood regulation was also impaired, though the patients were still able to experience negative emotions.

Long-term apathy and resistance to change frequently follow FLD (Hall, 1993); this phenomenon is also known as “pseudodepression” which exhibits shallowness and indifference as its main characteristics (Kwentus, Hart, Peck and Kornstein, 1985), thus retarding the ability to experience the full spectrum of human emotion. Those with FLD are also known to exhibit child-like immaturity at times (Kwentus *et al.*, 1985), as well as high levels

of risk taking, excessive drinking, free use of profanity, and fits of rage (Silver and Yudofsky, 1987). FLD impairs a patient's ability to adapt to change, many times locking the individual in mental or behavioral patterns (Kendel and Freed, 1989). Regarding interpersonal inappropriateness, Lezak (1995) even goes so far as to state, "Frontal damage can be suspected in those ... whose affective or empathic capacity is muted" (p. 185). Magnified emotional swings may be also experienced in response to seemingly insignificant events due to FLD (Grafman *et al.*, 1996). An increased propensity to compulsively collect tangible items, along with poor time management and tendencies to socially self-isolate are also typical of FLD patients (Damasio, 1994).

The overlapping similarities between patients with FLD and depressed military service members with physically intact frontal lobes inspired the theory of Chronic Emotional Atrophy (CEA) which is detailed below. This new theory of CEA attempts to bridge the gap between what is known and what is being experienced in relation to neurology, environmental factors, and military suicide. The theory helps to explain and predict depression leading to suicide in the military, using the literature on the frontal lobe as a point of departure.

THEORY OF CHRONIC EMOTIONAL ATROPHY (CEA)

This paper presents the new theory of Chronic Emotional Atrophy (CEA) which states that a person who is subjected to an emotionally suppressive environment for a substantial period of time will likely experience degraded emotional functioning within the frontal lobe. This inability to experience or express secondary emotion is detrimental to human welfare, resulting in many depressive symptoms similar to patients with Frontal Lobe Damage (FLD). Rudd (2012) frames suicide as a psychiatric illness which can be diagnosed over 90% of the time before death. This paper suggests that CEA is a major contributor of mental illness which leads to suicide in the US military. CEA theory advocates that military suicide is a systemic issue.

Military organizations are well known for producing men and women who think and act with machine precision. Public expression of feelings and human emotion are not encouraged in a "tough as nails" military culture where many are numb towards the effects of war. Emotion is typically perceived as a liability throughout the military; being an individual weakness at best or a danger to the mission at worst. Major General Pittard's recent official blog-posting highlights a culture where mental illness is often mistaken for individual choice or personal weakness (Firestone, 2012), "I am personally fed up with soldiers who are choosing to take their own lives so that others can clean up their mess. Be an adult, act like an adult, and deal with your real-life problems like the rest of us."

Masculinity remains hegemonic within the US Military, where "real men" are expected to be strong, independent, powerful, and most admired when in total control at all times (Conrad and Warwick-Booth, 2010). Those males who fail to exhibit these qualities tend to be labeled as weak and are commonly chastised (Courtenay, 2000). According to Ben-Ari (1998) and Goldstein (2001), the social capital of a military organization is increased when new military members are indoctrinated into an emotionally suppressive culture ruled by a hierarchical disciplinary structure. Military personnel go beyond the ideal of simply adapting to emotional suppression by taking on the responsibility to also enforce it. Goldstein (2001) illuminates a serious but highly disregarded reality that many in the military are expected to solve problems like depression, PTSD, anxiety, fear etc. on their own, or suffer the consequences of humiliation and shame by their peers. This quote by Braswell and Kushner (2012) says it best, "The masculine fatalism of the military thus places soldiers in a particularly arduous double-bind: It traumatizes them and then, by feminizing their trauma, reinforces its most damaging aspects"

CEA-theory suggests that over time, exposure to such emotionally sterile environments is disastrous to the frontal lobe's ability to process secondary emotion; thus facilitating depressive symptoms and suicidal ideation. The emotional effectiveness of the frontal lobe atrophies in military environments due to severe underuse. Along that same line of logic, increased levels of frontal lobe stimulation (FLS) should promote mental health and greatly mitigate CEA and depression leading to suicide. Like FLD, CEA is a neurological condition that compromises free will leading to apathy, defective decision making and potentially sociopathic outcomes.

Figure 4 compares a medical patient with frontal lobe damage (left) versus a military member with a physically intact frontal lobe but in a suppressed emotional environment (right). Note that they both exhibit similar phenomena even though each has vastly different causal mechanisms: the medical patient is physically manipulated while the military member's exhibitions were environmentally induced. It is speculated that modifying environmental factors to promote frontal lobe stimulation via emotional expression and deep human connections could mitigate the effects of CEA, thereby reducing suicidal ideation and maintaining balanced mental health.

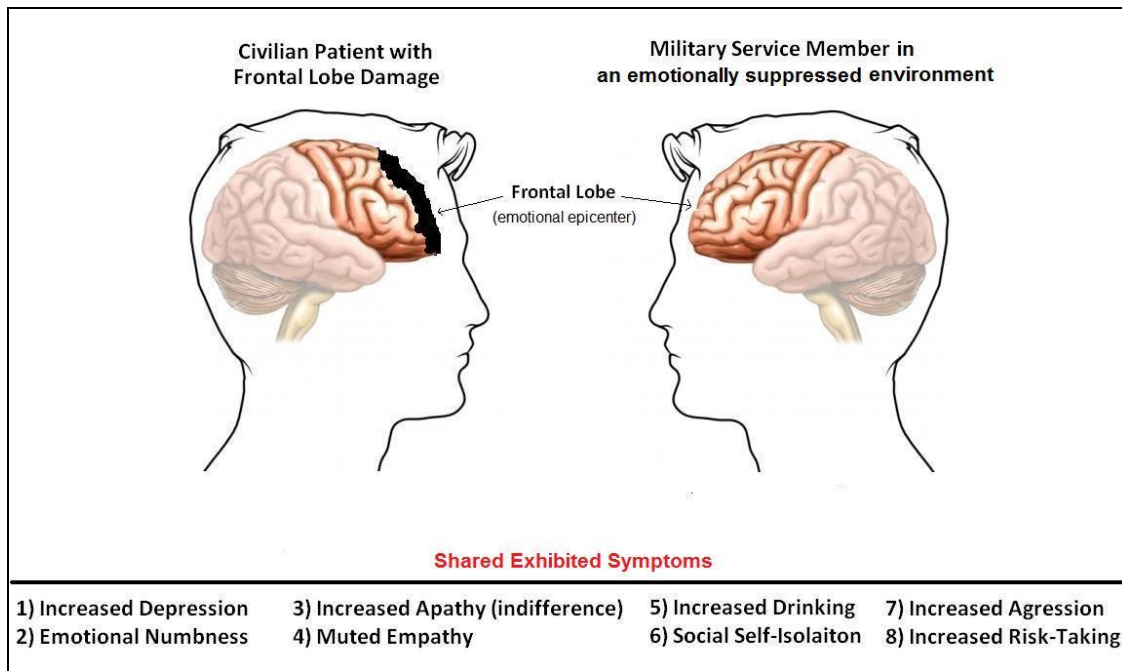


Figure 4 Diagram depicting similarity between civilian patients suffering from Frontal Lobe Damage (FLD) and a military member in an emotionally suppressed environment with Chronic Emotional Atrophy (CEA).

SUICIDE MITIGATION VIA INFORMATION SYSTEMS (IS)

Stanford’s collaborative design approach (Innovators, 2012) is a method that is excellent at solving complex problems. It was utilized to develop a web-based solution named the Emotional Vitality Assistant (EVA) that is: 1) socially desirable 2) technically feasible and 3) economically viable. EVA is designed to promote stimulation of the frontal lobe by supporting deep lasting human connections, expression of feelings, and sharing of emotions via different communication channels; in other words, EVA promotes those values of being innately human, thus inhibiting CEA and depression leading to suicide. It was created at the grassroots level within the military, offering a bottom-up approach to CEA mitigation. EVA is scalable and should remain flexible in use as a means of self-correcting such social alchemic methods. It is important to point out that EVA is still a concept, one that will hopefully be used as a blueprint should this IS solution be funded.

Emotional Vitality Assistant (EVA)

As it is right now, the traditional face-to-face military psychiatric system has many shortcomings (see table 1). EVA resolves most of these issues by utilizing information systems designed around human-centric solutions.

Military personnel constantly move around the world.	Multiple therapists throughout military career
Lack of continuity in military psychiatric record.	Military personnel tend to have lower levels of trust with new mental health providers.
Patients typically forget important events between sessions that should be discussed with therapist.	Seeking psychiatric assistance is perceived as a weakness in military culture.

Table 1. Shortcomings of traditional, face-to-face military psychiatric therapy

EVA is a web-based psychiatric support system that offers confidentiality, mobility, continuity, privacy, convenience and other benefits. Designed with military members in mind, EVA has two main processes with which to promote frontal lobe stimulation: personal expression and virtual therapy. Figure 5 portrays a military service member within the context of EVA and his “virtual” therapist.

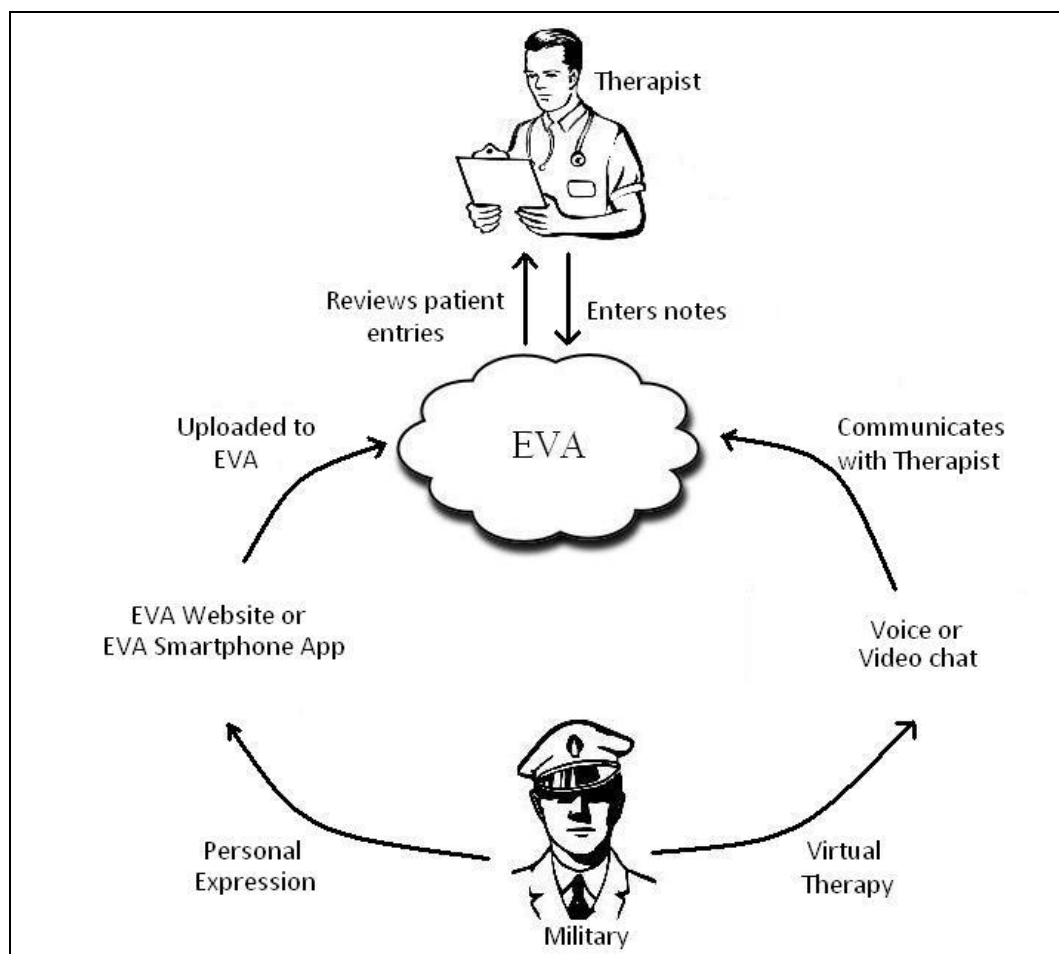


Figure 5. Basic model of the Emotional Vitality Assistant (EVA) information system, designed to combat Chronic Emotional Atrophy (CEA) within the US Military.

EVA: Personal Expression

Unrestricted and continuous forms of self-expression act as an emotional pressure relief valve while promoting frontal lobe stimulation (FLS). Building upon the adage “prevention is better than cure”, EVA is best introduced at the beginning of a military career and maintained throughout. Alternatively, seasoned military service members could also benefit from EVA, though the war-fighter stigma may be difficult to overcome. Since one of the main symptoms of CEA is social isolation, relying on service members suffering from CEA to voluntarily reach out for help would be counter-intuitive. Rather, it should be made mandatory that military personnel connect with EVA on a regular basis to express themselves via text, audio or pictures in an online journal. EVA would be designed to confidentially log any forms of self-expression shared by users of the system. An EVA website would be available for military personnel to log in and express deep personal thoughts or feelings. A secure EVA Smartphone application could provide limitless opportunities for personal self-expression on-the-go, or even in remote locations of a combat zone or sea vessel. Entries can range from a simple sentence expressing things like, “I really miss my son” to more full accounts of personal feelings and emotions. Regular online journal entries would stimulate the frontal lobe, allow “virtual” therapists to track each service member in real time, and offer discussion points to make the most of virtual therapy sessions.

EVA: Virtual Therapy

Just as physical checkups are mandatory in the US military, so should psychiatric sessions. Mandatory “mental checkups” will not only mitigate the perception that seeking mental help is a sign of weakness, but it would also support early interception and pattern detection of mental problems. Virtual therapy sessions using EVA would always be highly confidential and done via video chat or voice communications. Civilian therapists should be used as a military therapist’s rank may hinder sincere secondary emotional expression. Optimally, a service

member would have the same therapist for the duration of his/her career, thus allowing a valuable trusting relationship to grow over time while maintaining psychiatric continuity, regardless of the military members' shifting worldwide assignments. Several service members could be assigned to a single "virtual" therapist who would maintain each member's file on the EVA database.

EVA would notify virtual therapists to review personal expressions of their patients as entries are submitted. Virtual therapists could also use EVA to pre-scan years of patient log files for patterns which may flag potential for suicidal ideation. Should a virtual therapist need to be replaced, the new therapist would be able to read the historical files of the military member and quickly get up to speed on the psychological status of that patient.

CONCLUSION

Suicide in the US Military is at an all time high with rates at approximately one active duty suicide per day. Even more troubling is the suicide rate of US veterans which is currently about one every hour. Such statistics describe a social crisis of potentially epic proportions, mainly due to the lack of rigor in reporting suicide mortality nationwide. Although an immense and commendable effort by military leadership and experts attempt to provide therapeutic support for those in need, an emotional deficiency remains as the war-fighter stigma perceiving emotions as weakness is intensely engrained in military culture and remains a challenge to break.

The frontal lobe is responsible for those secondary emotions which make us innately human. A healthy frontal lobe is required for proper emotional responses, creative thinking, decision making, artistic expression and social behavior. Medical patients with frontal lobe damage (FLD) exhibit symptoms of emotional numbness, social isolation, apathy, triggered mood swings, increased drinking, risk taking, aggression and violence among other traits. Textbook telltale signs of FLD very closely mirror symptoms demonstrated by service members in emotionally suppressed US military environments.

It is theorized that the extreme emotional suppression imposed by military culture induces Chronic Emotional Atrophy (CEA) due to dangerous prolonged underuse of the secondary emotional function of the frontal lobe. As such, the emotional capacity of the frontal lobe atrophies thereby losing the ability to express secondary emotions as part of the normal human condition. It is speculated that military members suffering from CEA share a higher propensity for mental illness and suicidal ideation.

This paper offers a detailed conceptual information system design dubbed the Emotional Vitality Assistant (EVA) which stimulates the frontal lobe by promoting personal expression and focusing on deep emotional human connections to help combat CEA. Frontal lobe stimulation (FLS) is a holistic approach to combating the systemic issue of suicidal ideation. The mitigation strategies put forward concentrate on keeping service members mentally healthy, though similar strategies may be helpful for those who are severely depressed providing traditional therapeutic methods are still implemented.

FUTURE WORK

This paper presents a new theory designed to guide and generate innovative suicide prevention research in the US military. Further quantitative, qualitative and mixed methods research would prove useful in refining the theory of Chronic Emotional Atrophy (CEA), studying the effects of the Emotional Vitality Assistant (EVA) information system on CEA, and developing methods of determining those who may have a higher predisposition to developing CEA. Should funding and support for CEA theory or the development of EVA persist, a quantitatively supported ethnography would be the next step in this research endeavor.

ACKNOWLEDGEMENTS

This paper would not have been possible without inspiration and frontal lobe stimulation from Dr. Nancy Roberts, the Wicked Problems professor at the Naval Postgraduate School.

ABOUT THE AUTHORS

LT Darryl Diptee is a problem-solver who is passionate about developing information systems for humanitarian causes. He is currently an Information Assurance Officer at U.S. Fleet Forces Command in Norfolk, Virginia.

LTJG Jason Baker's research interests are grounded in the psychology of suicide and addiction. He is currently the Information Assurance Manager onboard the United States Ship (USS) BATAAN in Norfolk, Virginia.

REFERENCES

1. AFP (2009) Lack of healthcare killed 2,266 US veterans last year: study. Retrieved from http://www.google.com/hostednews/afp/article/ALeqM5iXSJa5eFMuXF2Uxwptns_JOxRcMA.
2. Ben-Ari, E. (1998) *Mastering soldiers: Conflict, emotions, and the enemy in an Israeli military unit*. New York: Berghahn Books.
3. Braswell, H. and Kushner, H. I. (2012) Suicide, social integration, and masculinity in the U.S. military. *Social Science & Medicine*, 74(4), 530-536. doi:<http://dx.doi.org/10.1016/j.socscimed.2010.07.031>
4. Briggs, B. (2013) Military suicide rate hit record high in 2012. NBC News. Retrieved from http://usnews.nbcnews.com/_news/2013/01/14/16510852-military-suicide-rate-hit-record-high-in-2012?lite
5. Brower, M.C. and Price, B.H. (2001) Neuropsychiatry of frontal lobe dysfunction in violent and criminal behavior: A critical review. *Journal of Neurology, Neurosurgery and Psychiatry*, December 2001, 71, 6.
6. Burns, R. (2012) Suicides are surging among US troops. Associated Press. Retrieved from <http://www.military.com/daily-news/2012/06/08/suicides-are-surging-among-us-troops.html>
7. Conrad, D. and Warwick-Booth, L. (2010) Cultural representations of masculinity and mental health. *Promoting Men's Mental Health*, 18.
8. Courtenay, W. H. (2000) Constructions of masculinity and their influence on men's well-being: A theory of gender and health. *Social Science & Medicine*, 50(10), 1385-1401. doi:[http://dx.doi.org/10.1016/S0277-9536\(99\)00390-1](http://dx.doi.org/10.1016/S0277-9536(99)00390-1)
9. Damasio, A. (1994) *Descartes' Error. Emotion, reason and the human brain*. Penguin Group. New York.
10. Depression (2005) What every woman should know. National Institute of Mental Health. NIH Publication No. 05-4779. website: <http://www.nimh.nih.gov>
11. Estimates in homelessness (2011) Supplement to the annual homeless assessment report. US Department of Housing and Urban Development. Retrieved from www.usich.gov/resources/uploads/asset_library/BkgrdPap_Veterans.pdf
12. Firestone, L. (2012) What's killing our soldiers? What to do about the increased rates of suicide in the military. *Psychology Today*. Retrieved from <http://www.psychologytoday.com/blog/compassion-matters/201209/what-is-killing-our-soldiers>
13. Goldstein, J. S. (2001) *War and gender: How gender shapes the war system and vice versa*. Cambridge: Cambridge University Press.
14. Grafman, J., Schwab, K., Warden, D., Pridgen, A., Brown, H.R. and Salazar, A.M. (1996) *Frontal lobe injuries, violence and aggression: a report of the Vietnam head injury study*. *Neurology*, Vol. 46:1231-8.
15. Hall, H.V. (1993) Criminal-forensic neuropsychology of disorders of executive functions. In H.V. Hall & R.J. Sbordone (Editors), *Disorders of executive functions: Civil and criminal law applications* (pp.37-77). Winter Park, FL: PMD Publishers.
16. Harrell, M.C. and Berglass, N. (2011) *Losing the battle: The challenge of military suicide*. Center for a new American Security. Retrieved from <http://www.cnas.org/losingthebattle>
17. Innovators, not Innovations, (2012) Stanford d School. Retrieved from <http://dschool.stanford.edu/our-point-of-view/#design-thinking>
18. Kendel, E. and Freed, D. (1989) Frontal-lobe dysfunction and antisocial behavior: A review. *Journal of Clinical Psychology*, 45, 404-413.
19. Kemp, J. and Bossarte, R. (2012) *Suicide Data Report. Department of veterans' affairs mental health services suicide prevention program*. Retrieved from <http://www.va.gov/opa/docs/Suicide-Data-Report-2012-final.pdf>
20. Kwentus, J.A., Hart, R.P., Peck, E.T. and Kornstein, S. (1985) Psychiatric complications of closed head trauma. *Psychosomatics*, 26, 8-17.
21. Kuhn, T. (1996) *The structure of scientific revolutions*. University of Chicago Press. 3rd Ed.
22. Lezaks, M.D. (1995) *Neuropsychological assessment* (3rd Ed.). New York: Oxford University Press.
23. Moselhy, H.F., Georgiou, G. and Kahn, A. (2001) Frontal lobe changes in alcoholism: a review of the

- literature. *Alcohol and Alcoholism*, Vol. 36, No. 5, pp. 357-368, 2001.
24. Nautra, W.J.H. (1971) The problem of the frontal lobe. *Journal of Psychiatric Research*, 8, 167-187.
 25. Paradiso, S., Chemerinski, E., Yazici, K.M., Tartaro, A. and Robinson, R. G. (1999) Frontal lobe syndrome reassessed: Comparison of patients with lateral or medial frontal brain damage. *Journal of Neurology, Neurosurgery and Psychiatry*, 67, 5: 664-7.
 26. Parrott, W. (2001) *Emotions in Social Psychology*. Psychology Press, Philadelphia
 27. Roberts, N. (2000) *Wicked Problems and Network Approaches to Resolution*. International Public Management Review, Vol. 1, No.1, pp 1-4
 28. Rolls, E.T. (2004) The functions of the orbitofrontal cortex. *Brain and Cognition*, 55(1), 11-29.
 29. Room for Debate (2011) *How can we prevent military suicides?* New York Times, Opinion Pages. Retrieved from <http://www.nytimes.com/roomfordebate/2011/11/20/how-can-we-prevent-military-suicides>
 30. Rudd, D.M. (2012) *Mounting Tolls of a 10-Year War*. New York Times, Opinion Pages. Retrieved from <http://www.nytimes.com/roomfordebate/2011/11/20/how-can-we-prevent-military-suicides/veteran-suicides-reflect-the-toll-of-a-10-year-war>
 31. Semendeferi, K., Damasio, H., Frank, R. and Van Hosen, G.W. (1997) The evolution of the frontal lobes: a volumetric analysis based on three-dimensional reconstructions of magnetic resonance scans of humans and apes. *Journal of Human Evolution* 32, 375-388.
 32. Silver, J.M. and Yudofsky, S.C., (1987) Aggressive behavior in patients with neuropsychiatric disorders. *Psychiatric Annals*, 17, 367-370.
 33. Stuss, D.T. and Benson, D.F. (1986) Neuropsychological studies of the frontal lobes. *Psychological Bulletin* 95, 3-28.
 34. Suicide Prevention (n.d.) Training tip card. Retrieved from <http://cpol.army.mil/news/201209/suicide-prevention-training-tip-card.pdf>
 35. Thompson, M. and Gibbs, N. (2012) One a Day. *Time Magazine*, Vol. 180, No. 4.
 36. Vital Mission (2008) *Ending homelessness among veterans*. Homeless Research Institute. Retrieved from www.usich.gov/resources/uploads/asset_library/BkgrdPap_Veterans.pdf
 37. Wong, K. (2011) Rising suicide rates stump military leaders. Retrieved from <http://abcnews.go.com/US/rising-suicides-stump-military-leaders/story?id=14578134>